



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Takashi MIYAKAWA et al.

Group Art Unit: 1732

Application No.: 10/717,502

Examiner: J. WOLLSCHLAGER

Filed: November 21, 2003

Docket No.: 117848

For: PROCESS FOR PRODUCTION OF FORMED HONEYCOMB BODY, AND
HONEYCOMB STRUCTURE

REPLY BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following remarks are directed to the new points of argument raised in the Examiner's Answer dated March 6, 2008. As explained in detail below, the Examiner's Answer continues to unreasonably combine features of the applied references without the requisite articulated reasoning and rational underpinning to support a conclusion of obviousness. Appellants respectfully submit that the Examiner's Answer improperly combines features that would not have been obvious, or arrived at with a reasonable expectation of success, based on the disclosures of the references or any other objective evidence of record.

Accordingly, this Honorable Board should reverse the rejections of claims 1-10 and 13.

A. **One Of Ordinary Skill In The Art Would Not Have Had A Reasonable Expectation Of Success In Combining U.S. Patent No. 4,851,376 (Asami), JP55-152011 (JP 55) And The Alleged Official Notice In The Manner Suggested.**

The Examiner's Answer improperly maintains that the present subject matter would have been obvious over Asami, JP55 and Official Notice by continuing to disregard the thrust of Appellants' arguments. Contrary to the assertions of the Examiner's Answer, the relied-upon portions of JP55 would not have logically commended themselves to one of ordinary skill in the art looking to modify the method of Asami, and would certainly not have led to the specific combination of features recited in the pending claims with a reasonable expectation of success.

In this regard, the Examiner's Answer continues to ignore the significant problems identified in Appellants' disclosure, as well as those detailed in Asami itself, in asserting that it would somehow have been obvious to modify Asami and arrive at the subject matter of the pending claims.

The Examiner's Answer relies on Asami as allegedly disclosing mixing, by a mixer, a raw material for forming a honeycomb body structure containing at least a ceramic raw material powder, a binder and water, to obtain a compounded mixture for forming a green body; adding a predetermined amount, to the raw material for forming the honeycomb body, a powdery material obtained by crushing, into a maximum particle diameter of 50 mm or smaller, a crushed green body (dried reclaimed unfired/green material) having substantially same composition as the compounded mixture for forming the green body.

The Examiner's Answer concedes that Asami does not disclose the crushed body being obtained from a rejected product of an undried formed material, and other features including a resulting mixture is mixed thoroughly by the mixer to obtain the compounded mixture for forming the green body; kneading and extruding the compounded mixture for forming the

green body into a honeycomb shape by a continuous extruder, to obtain the formed honeycomb body; and wherein the mixer includes a hoe that rotates at a low speed and a chopper having a cross-shaped blade that rotates at a high speed.

The Examiner's Answer maintains that it would have been obvious to one of ordinary skill in the art to modify Asami to use an undried reclaimed material (a) to eliminate a an undesired process step; (b) because the addition of water is to a dried reclaimed material is allegedly taught to be beneficial by Asami; and (c) because JP55 allegedly shows that drying of the reclaimed/returned is not required. The Examiner's Answer goes on to assert that it would also have been obvious to one of ordinary skill in the art to modify Asami to include a mixer with a hoe that rotates at a low speed and a chopper having a cross-shaped blade that rotates at a high speed in view of Official Notice, as allegedly supported by U.S. Patent No. 5,900,051 to Brown, because Brown suggests that such a mixer can blend materials in a short time.

Finally, the Examiner's Answer asserts that it would have been obvious to further modify Asami in view of Official Notice, without evidentiary support, that the crushed green body is added in an amount about 30 parts by mass or less relative to about 100 parts by mass of the ceramic raw material powder (as in claims 3 and 4); and wherein an average specific total volume shared by distributed pores is about 0.135 cc/g. (as in claim13).

These assertions are incorrect.

1. The Examiner's Answer Continues To Improperly Combine Different Embodiments Of Asami.

The Examiner's Answer concedes, on page 9, that separate embodiments of Asami are being used in support of the current rejection. In this regard, the Examiner's Answer asserts that the first, mechanical process, is being used to teach the process steps, and the second, slurry process, is being used to demonstrate a reasonable expectation of success that "wet/undried"

material can be effectively used in Asami's process. However, this rationale has a number of errors.

First, there is no objective evidence of record that (1) a chopped, dried material with water re-added, and (2) a powdery material obtained by crushing an undried formed material are equivalent states for any of the Asami materials or those of the pending claims.

Second, the mere fact that Asami may disclose a method of creating a slurry from a chopped, dried material with water re-added does not suggest a reasonable expectation of success in modifying the "mechanical process" of Asami, which is relied upon for the feature of maximum particle diameter of 50 mm or smaller, to use a powdery material obtained by crushing an undried formed material.

Third, even with the addition of water, the particles in Asami are still particles made from dried unclaimed material. It is improper for the Examiner to continue to assume, without any objective evidence of record, that the use of particles made from dried unclaimed material would have obviously suggested a corresponding use of undried materials, particularly in view of the express and repeated terms of Asami that do not include, or draw any equivalence to, undried materials.

2. Using Reclaimed Undried Articles In Asami Would Not Have Been Predictable Based On Asami Or JP55.

The Examiner's Answer fails to establish by objective evidence of record that the broad disclosure of JP55 would have yielded a predictable result in the specific method disclosed by Asami.

Asami discloses that the coefficient of thermal expansion is "the most important property of a cordierite ceramic body" (see col. 4, line 66 - col. 5, line 2), and notes that the coefficient of thermal expansion is closely associated with a cordierite reaction process in which "the cordierite is crystallized at a temperature between 1200° C and 1350° C." A

coefficient of thermal expansion that is too high results in a substandard formed body after firing. Thus, Asami discloses a method whereby careful checking of the cordierite reaction ratio R of dried cordierite articles may be used to eliminate the dried cordierite articles it deems unusable (see col. 5, lines 24-49). There is no suggestion in Asami or JP 55 that a similar level of success or predictability could obviously be achieved by reclaiming undried green bodies in the context of the Asami method. The broad assertion in JP55 that a part of a ceramic material may be returned back to the process does not establish that this could be achieved with a reasonable expectation of success in Asami.

JP55 discloses a punching method wherein chip-like articles are obtained by punching a kneaded material. A pottery raw material having moderate amount of water is extruded by a vacuum extruding machine, and part of the pottery raw material extruded from the vacuum extruding machine is returned back to the process before kneading to facilitate kneading of the raw pottery material so as to decrease distortion. The kneaded material contains materials that remain after punching, such as punched residues collected after punching with a kneader. Such a process would not have logically commended itself to one of ordinary skill in the art looking to modify Asami, and would not have led to the combinations of features positively recited in claim 1 with a reasonable expectation of success.

JP55 does not disclose mixing a rejected product of an undried formed material, as claimed. Rather, it simply removes and re-adds material to facilitate kneading in a method which is free from the formation of the lumps in the green body to be extruded from an extruder, and thus does not address any identified problems in Asami or the problems solved by embodiments of the claimed subject matter. Moreover, JP55 does not teach or suggest formation of through channels as cells, which is a requisite element of a honeycomb green body. Thus, it cannot simply be assumed that the reuse of material in JP55 could be obviously applied to Asami.

The Examiner's Answer does not address these significant differences in the scant disclosure of JP55 with respect to Asami, or the resultant shortfalls in establishing a reasonable expectation of success in the asserted modification of Asami.

3. **The Applied Prior Art Does Not Teach Or Suggest "A Hoe That Rotates At A Low Speed And A Chopper That Rotates At A High Speed" In The Context Of The Claimed Invention.**

The Examiner's Answer attempts to assert that it would have been obvious to employ the mixer of Brown in Asami because such a mixer can effectively blend materials in a short amount of time, and is effective at forming appropriate sized agglomerates of particles for further use that don't tend to form lumps. However, the Examiner's Answer still fails to indicate how the use of this mixer in the context of the claimed invention is common knowledge or well-known in the art, or how it would have been obviously compatible with the specific materials and/or objectives of Asami.

As indicated previously, Asami notes that the particles of an ordinary cordierite material are soft and easily damaged by mechanical impacts and can undergo mechanochemical changes in their crystal structure. In order to reduce the probability of this damage and/or these changes, Asami clearly indicates to only use relatively "small impact" and to "lightly" smash the material (see col. 7, line 62 - col. 8, line 11). Thus, the increase of mixing shear would be contrary to Asami's teachings, as it would damage Asami's particles.

The Examiner's Answer attempts to shift the burden to Appellants to establish that the mixer of Brown would be incompatible with Asami, without first making the requisite showing that the Brown mixer would not only have been compatible with Asami, but that it would have been an obvious.

**B. Claims 3 And 4 Would Not Have Been Obvious Over
Asami In View Of JP 55.**

Claim 3 recites, in part, "a process for producing a formed honeycomb body according to Claim 1, wherein the crushed green body is added in an amount about 30 parts by mass or less relative to about 100 parts by mass of the ceramic raw material powder." Claim 4 recites a similar feature.

**1. The Examiner's Answer Fails To Present Evidence
That The Allegedly Optimizable Variables Were
Recognized As Result-Effective Variables In The
Prior Art.**

The Examiner's Answer asserts that the combination of Asami and JP55 suggests controlling the level of undried, unfired, rejected material to levels that would achieve the required product quality while minimizing production costs. This is not the standard for establishing a result-effective variable.

MPEP §2144.05(II)(B) states that "a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation" (emphasis added). Therefore, to support the assertion that the recited ratio of "wherein the crushed green body is added in an amount about 30 parts by mass or less relative to about 100 parts by mass of the ceramic raw material powder" would have been obvious through optimization of a result-effective variable, the prior art must first teach or suggest that the amount of crushed green body obtained from a "rejected product of an undried formed material" is known to be a result-effective variable.

The applied prior art does not recognize that the recited ratio is a result-effective variable. As discussed above, the applied prior art does not disclose the use of a "rejected product of an undried formed material."

C. Conclusion

For all of the reasons discussed above, it is respectfully submitted that the rejections are in error and that claims 1-10 and 13 are in condition for allowance. For all of the above reasons, Appellants respectfully request this Honorable Board to reverse the rejections of claims 1-10 and 13.

Respectfully submitted,



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